

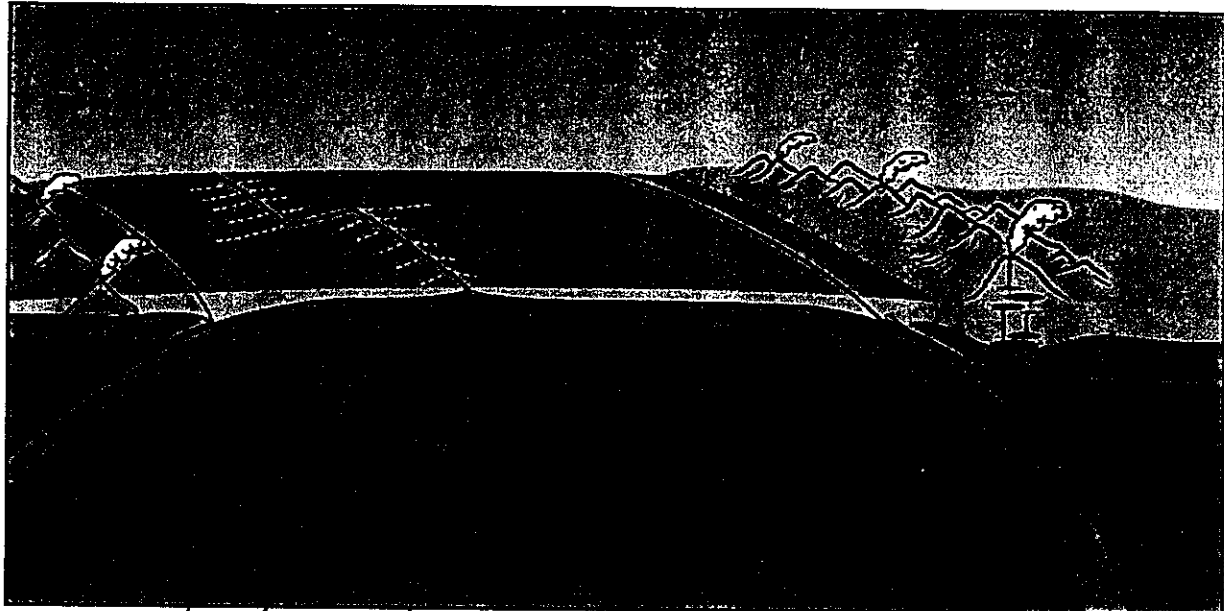
Part 2: Group Work

GROUP #: A
Student IDs of Members Present:

A41694022 A43573450

A41744376 A40706302

A40296306



© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

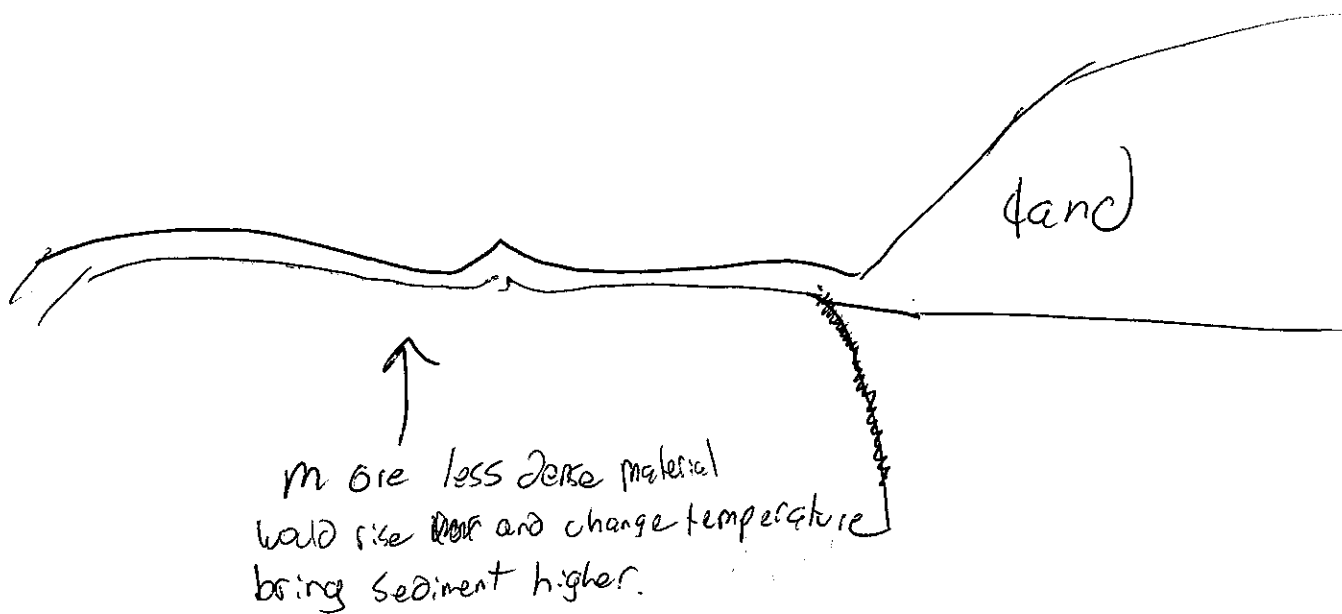
1. Explain why density is such an important concept for asthenosphere convection.

Because the crust is cooler, more dense and results in sinking into the mantle which drives convection

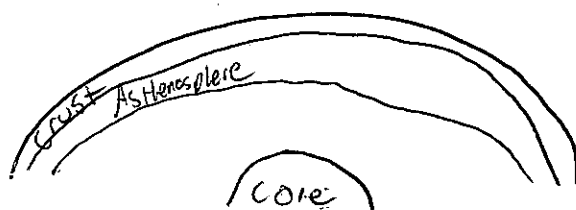
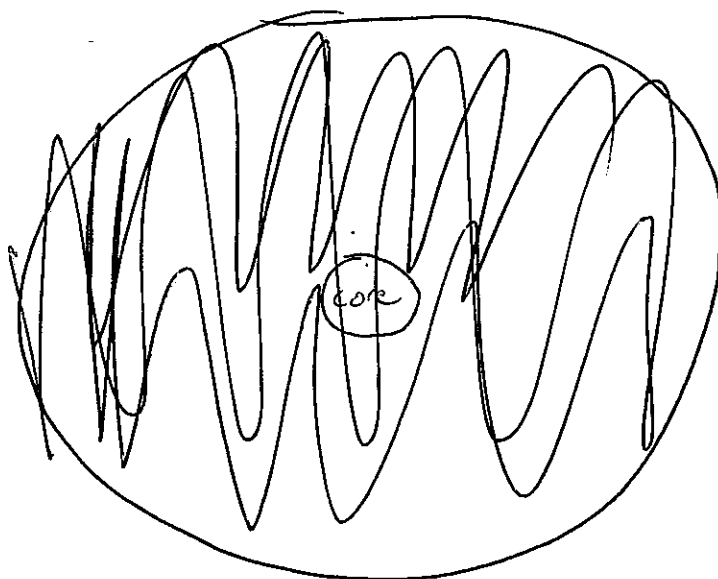
2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.
4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.

USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

3.



4.



- The laws of gravity still apply and even if density is affected it won't reverse the sinking action of the core

Part 2: Group Work

GROUP #: B

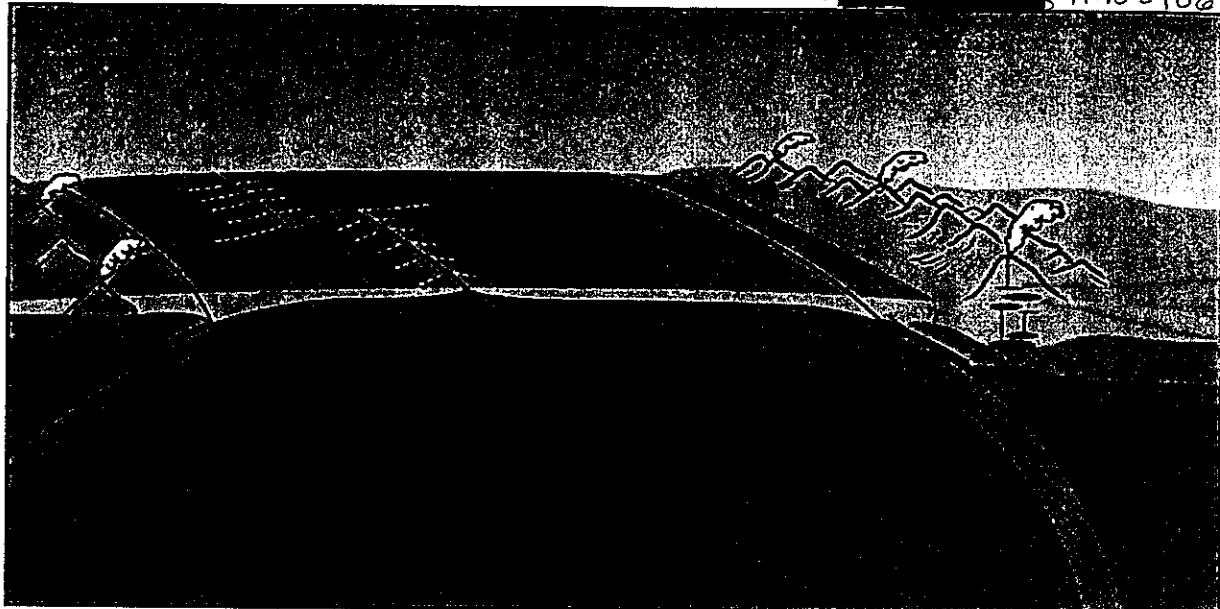
Student IDs of Members Present:

██████████ A40290629

██████████ A39963430

██████████ A43979706

██████████ A40290629



Thermal

Chemical

Gravitational

Chemical Thermal
(radioactive decay)

© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

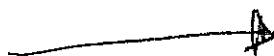
1. Explain why density is such an important concept for asthenosphere convection.

AS the older earth cools and gains density, it sinks deeper into the mantle. When it reaches this area, radioactive decay occurring near the surface of the earth causes the plate to heat up and decrease in density. This means it will rise toward the cooler surface yet again (convection cycle in mantle).

2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.

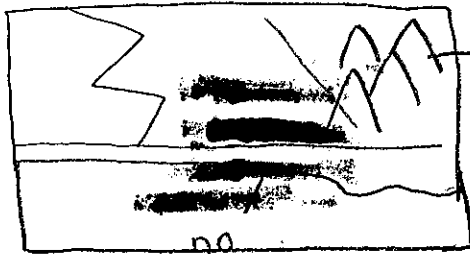
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world. Because volcanoes often form when subduction occurs, if plates weren't being pulled towards Earth's center but instead being pulled toward the surface, there could be less volcanoes forming and more earthquakes occurring instead.

4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.



USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

③



more mountains
and earthquakes
(convergence rather than subduction)

no
subduction
of plates

④



outer layer

mantle

core

lithosphere

sinking due to gravitational pull /
lower temps

rising
material
due to increased
temps

→ the convection would actually
include material from the core
whereas traditional convection
is only including material from
the mantle/outer layer (lithosphere)

C

GROUP #:

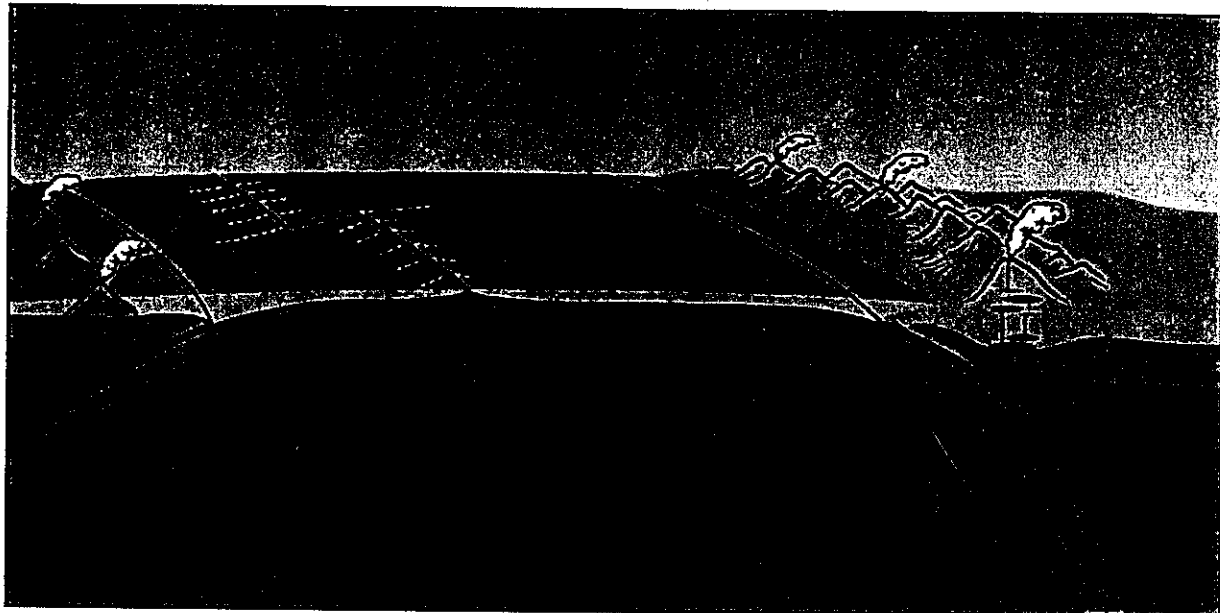
Student IDs of Members Present:

A42609057 A42473118

A42226052

A42741352

Part 2: Group Work



© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

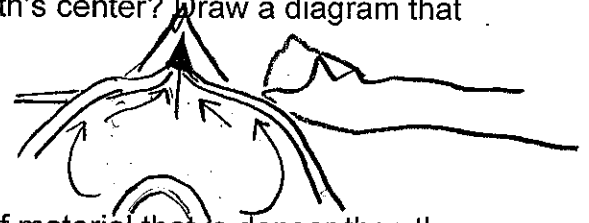
1. Explain why density is such an important concept for asthenosphere convection.

Because the differences in density decide which pieces of the Earth's crust & mantle fall below and which rise, thereby fueling plate tectonics.

2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.

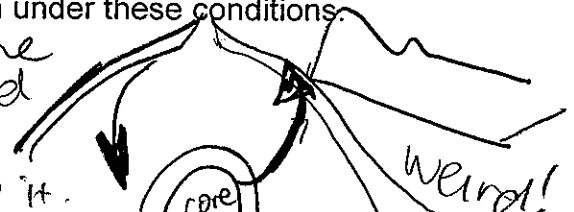
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.

The crust would all be forced to a peak, and there would be no rising.



4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.

The core would rise to the outside of the earth and that on top of the core currently would fall below it.



USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

Part 2: Group Work

GROUP #: D
Student IDs of Members Present:

A43570651 A40177778
A40627897 A37599308



© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

1. Explain why density is such an important concept for asthenosphere convection.

Because materials become less dense as they heat up and become more dense as they cool, forcing them to sink. Because density also drives buoyancy, buoyant objects sink as well.

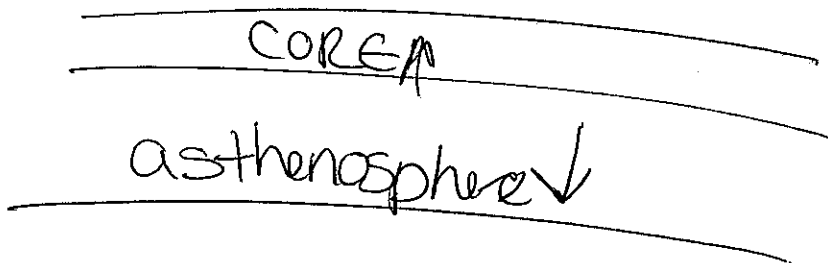
2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.
4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.

USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

3. More mountain building/forming would occur with oceanic crust as oppose to just ^{continental} lithospheric crust

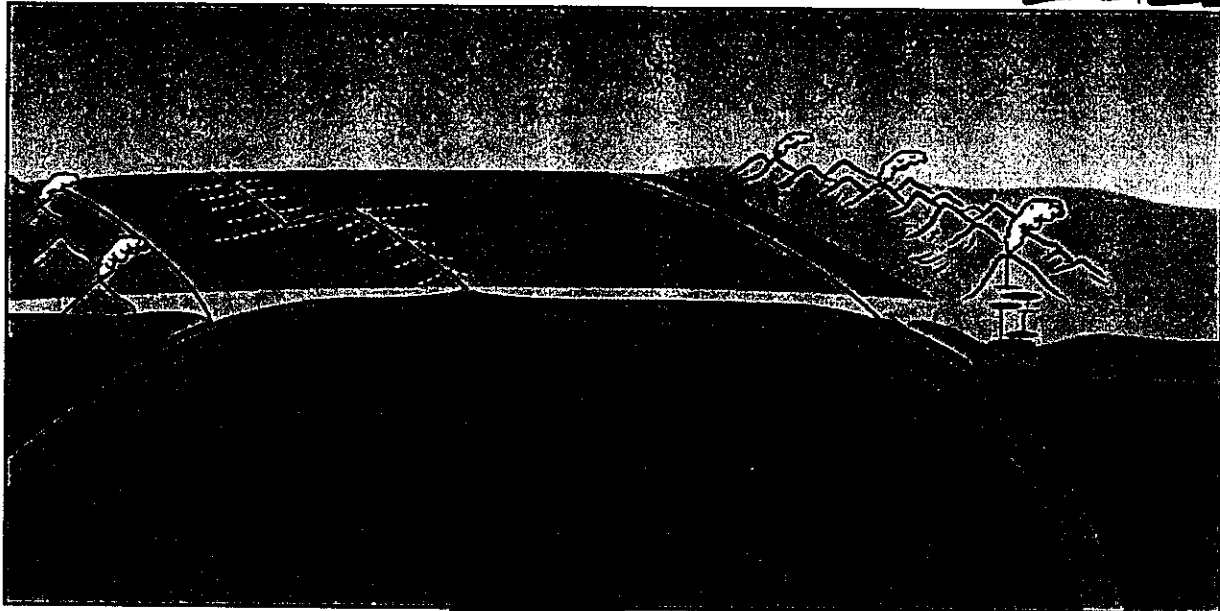


4. Because the core is less dense, gravity would cause the core to push up against the asthenosphere which is more dense, causing the asthenosphere to sink.



Part 2: Group Work

GROUP #: **E**
Student IDs of Members Present:
A42190700 - [REDACTED]
A40518651 - [REDACTED]
A39228140 - [REDACTED]
A41503028 - [REDACTED]

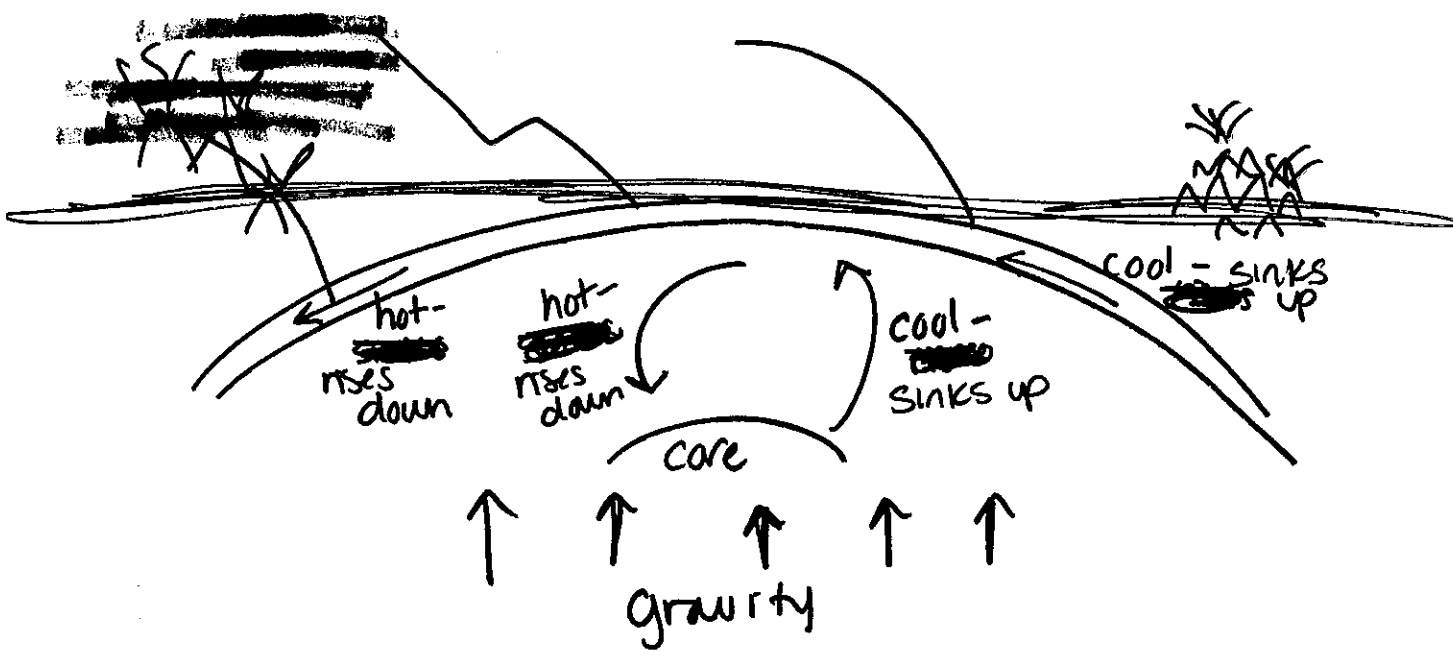


© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

1. Explain why density is such an important concept for asthenosphere convection.
Density causes the movement - hotter, less dense things rise, cooler more dense things sink.
2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.
Chemical energy is not driving the process, but does occur.
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.
on back
4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.
on back

USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

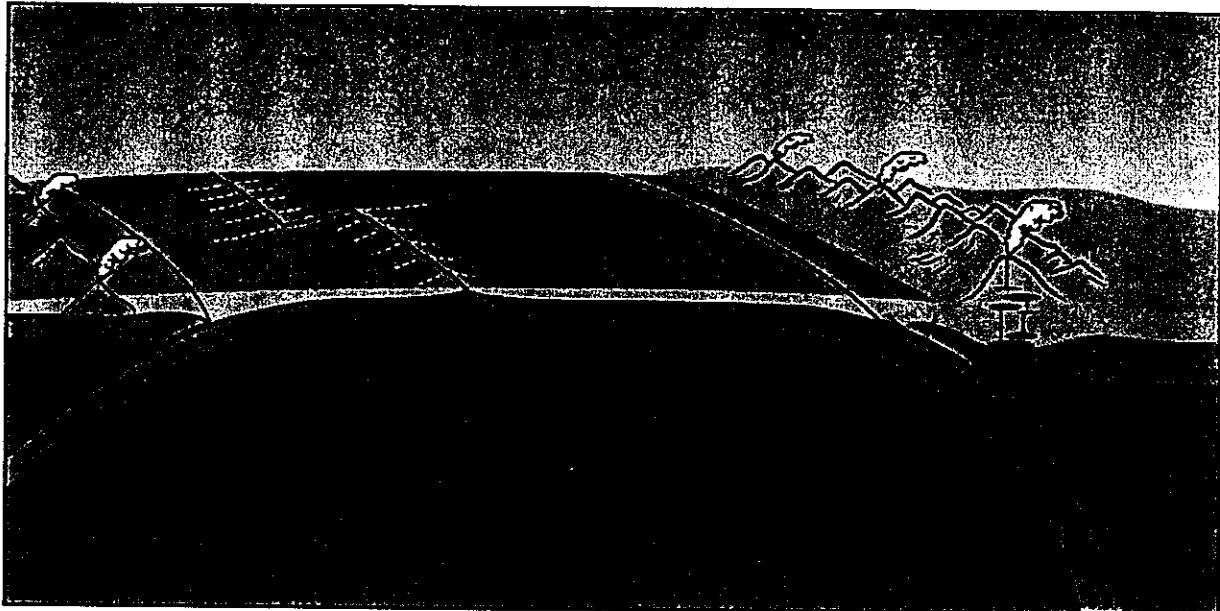
③



④ Same as 3

Part 2: Group Work

GROUP #: **F**
Student IDs of Members Present:
A42385484 A41450320
A42766830



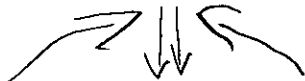
© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

1. Explain why density is such an important concept for asthenosphere convection.

Density causes the mantle to move down, while the continents don't move.

2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.

The convection would flow in reverse.



4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.

We would lose the continents because they would flow beneath the mantle, due to them being denser.

USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

Part 2: Group Work

GROUP #:

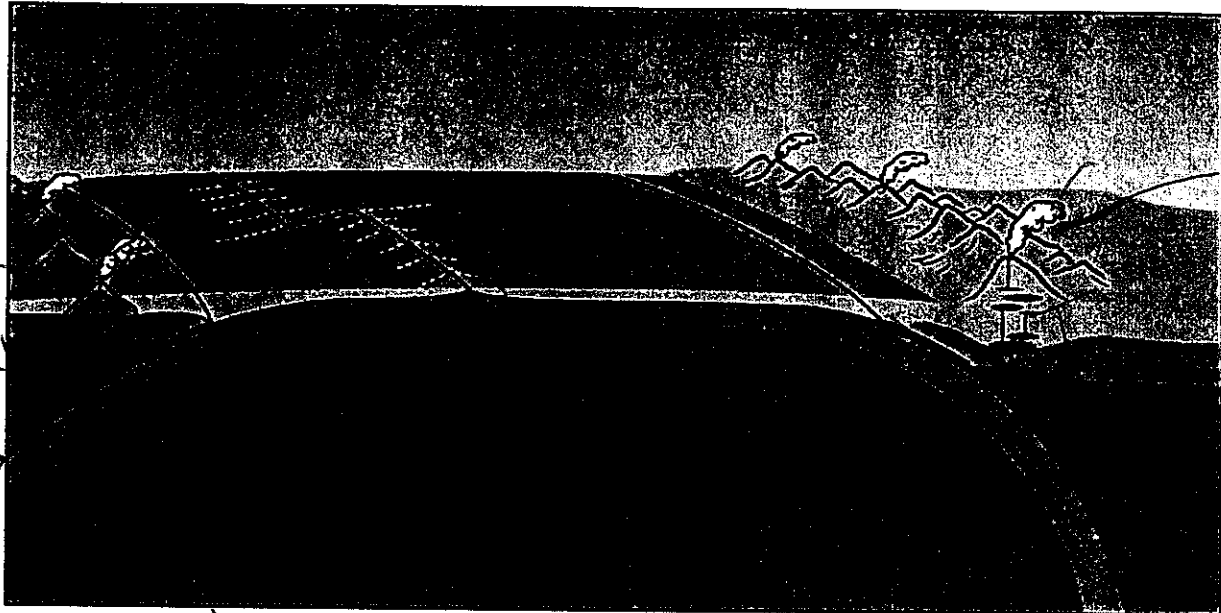
Student IDs of Members Present:

A 40659708

A42235241

A41398940

A90737921



↓ (core)

Temperature - residual heat/radioactive decay

© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

1. Explain why density is such an important concept for asthenosphere convection.

Because density is changing by temperature, when density increases it sinks.

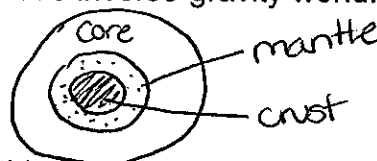
Density drives the convection of thermal energy in the asthenosphere - warm/less dense rising and

2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.

colder/denser driving the cycle.

3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.

~~more dense~~



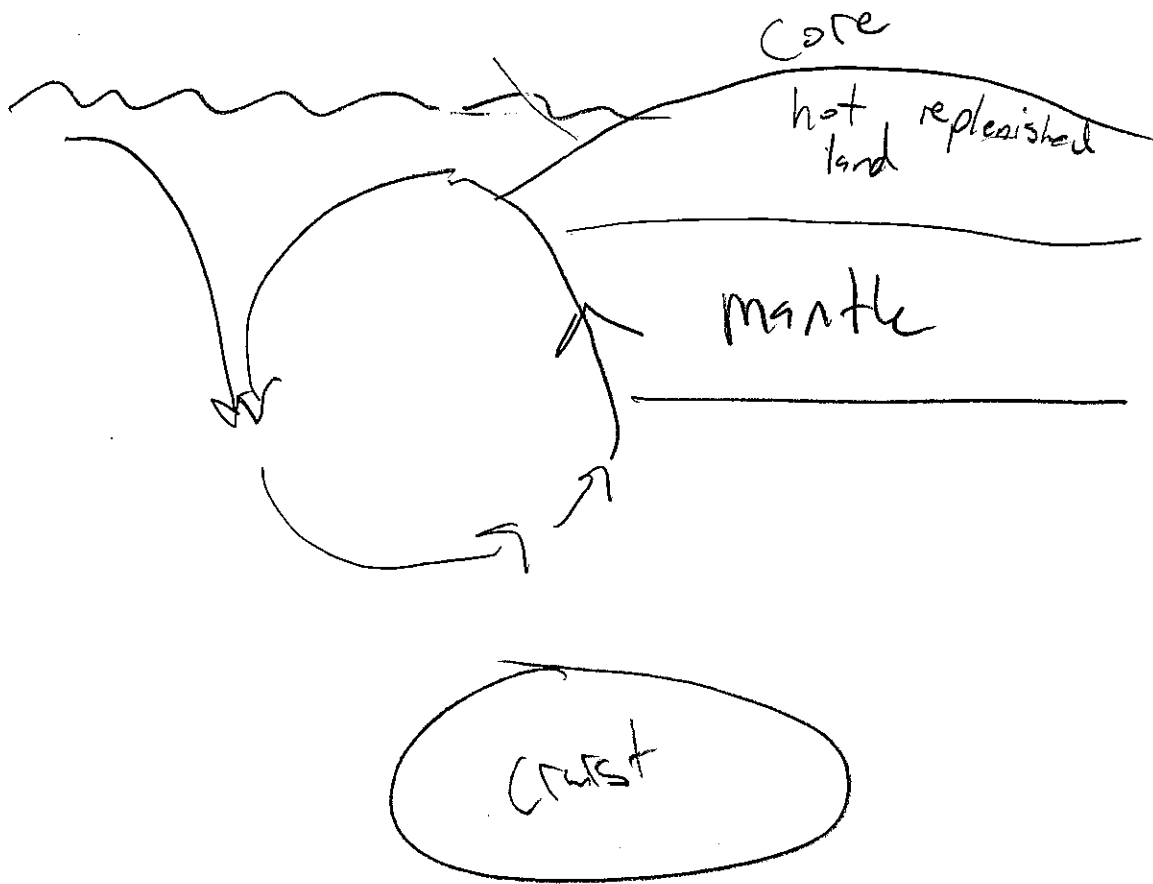
more dense core would be on the outside and less dense would be falling towards center.

4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.

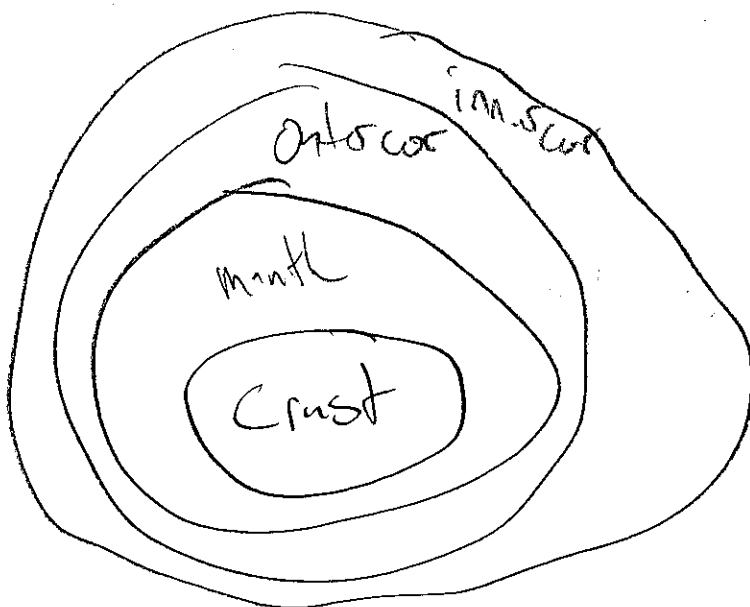


USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

- ③ layers would reverse, making land more hotter than the cool inner core.



- ④ Similar to #3 the more dense crust would be in the middle of the earth. The less dense inner core would be on the earth's surface



Convection runs by density, so the cycle would continue doing the same thing just replenishing different parts of the earth

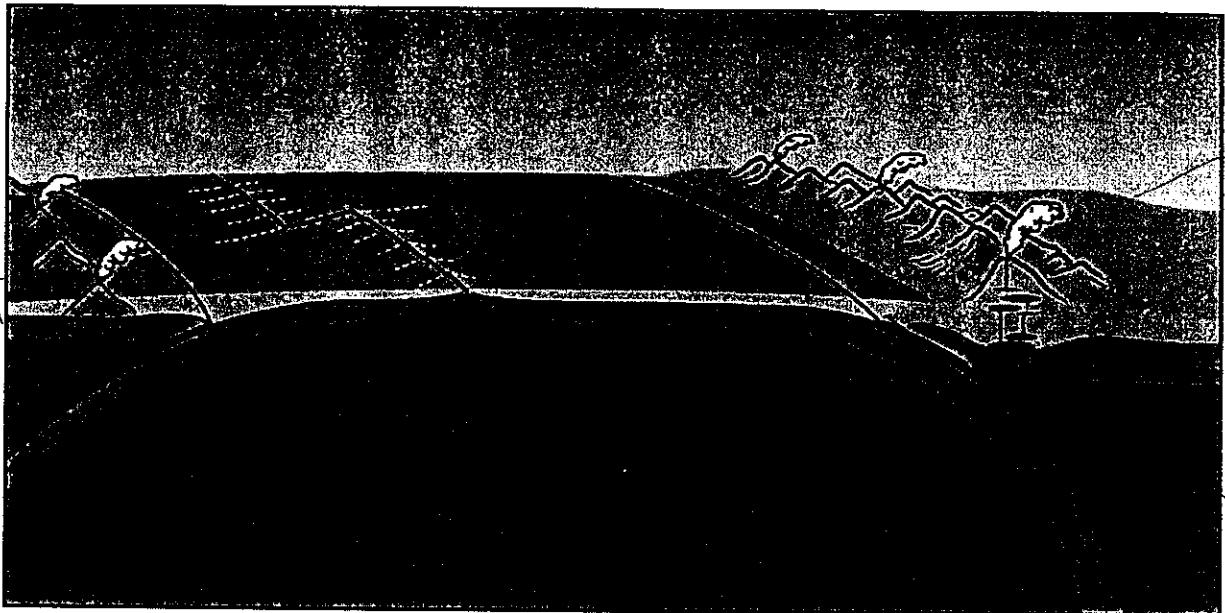
H

GROUP #: H
Student IDs of Members Present:

A3999552

A40761847

Part 2: Group Work



© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

1. Explain why density is such an important concept for asthenosphere convection.

As density varies so does pressure. The more dense an object is the more pressure that it will create on the objects surrounding it. This is crucial to asthenosphere convection because pressure promotes the diff movements.

2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.

Earth surface would get too hot.

4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.



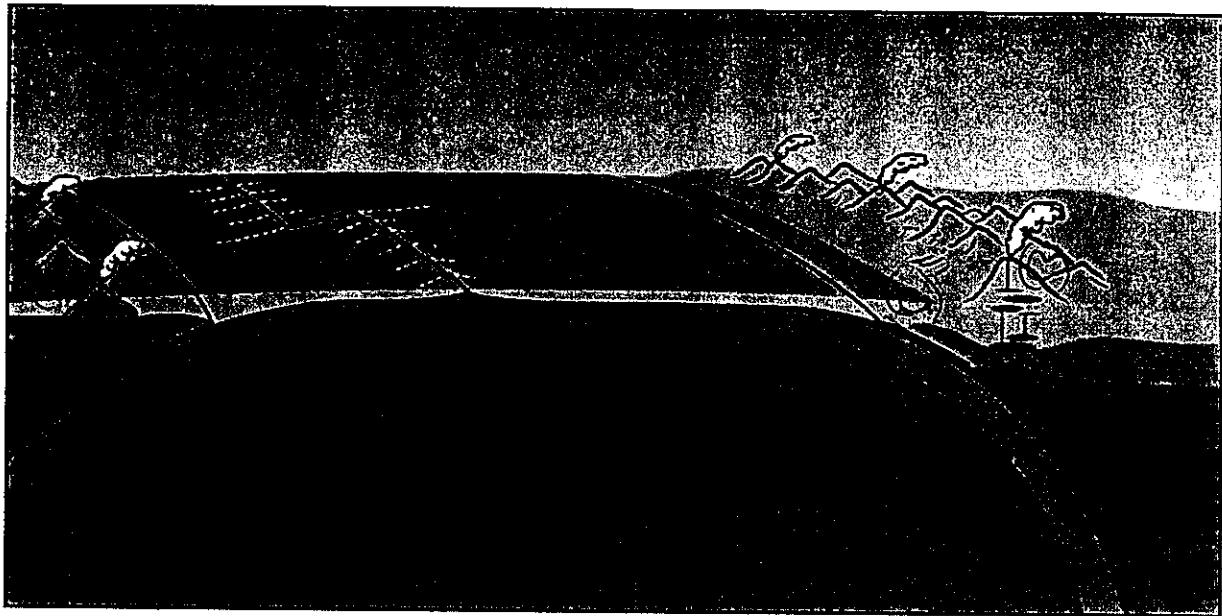
the earth's surface would be more soft and prompted to flex more being that it's being pressured by heat at pulled down by gravity toward it's more solid core.

USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

==

Part 2: Group Work

GROUP #: I
Student IDs of Members Present:
A12097140 A10006739
A40340284 A41696110

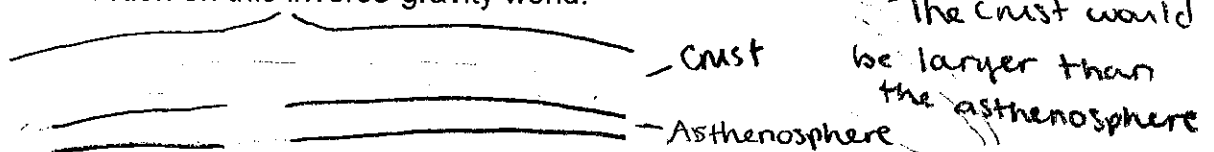


© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

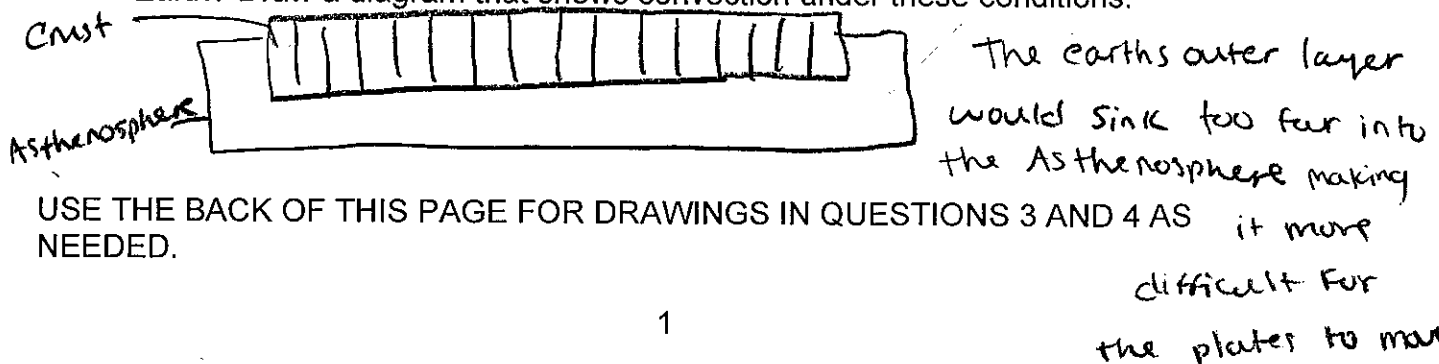
1. Explain why density is such an important concept for asthenosphere convection.

During asthenospheric convection the material is getting colder making it less dense and pulling the material back down further into the earth

2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.



4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.



USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

Part 2: Group Work

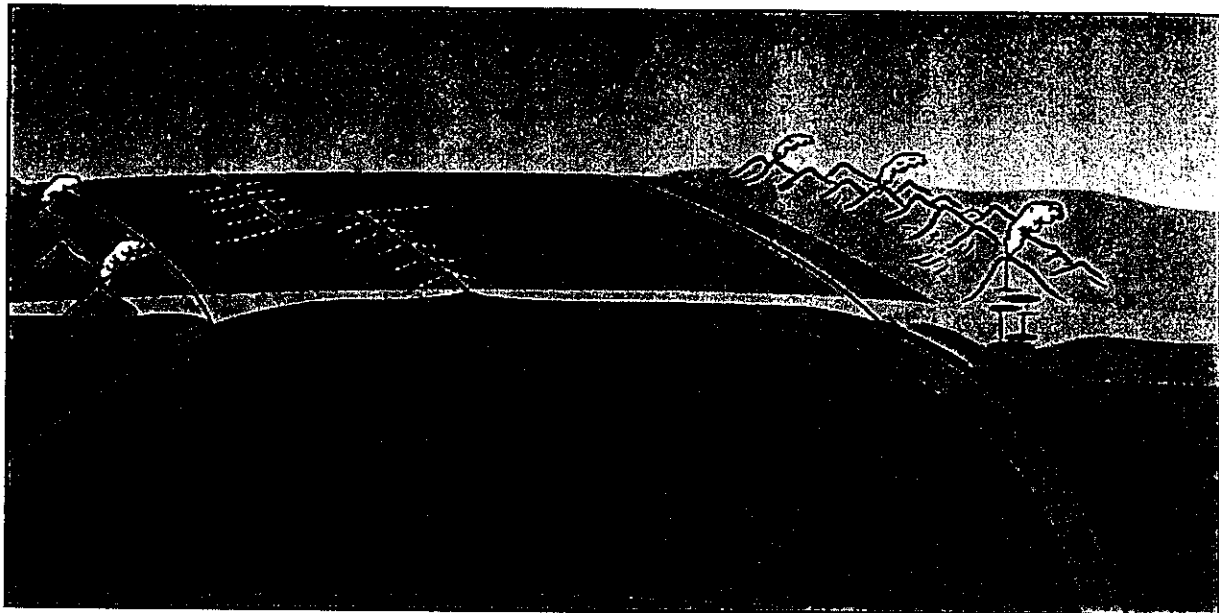
GROUP #: **J**
Student IDs of Members Present:

A43338446

A42601752

A42259800

A41069790



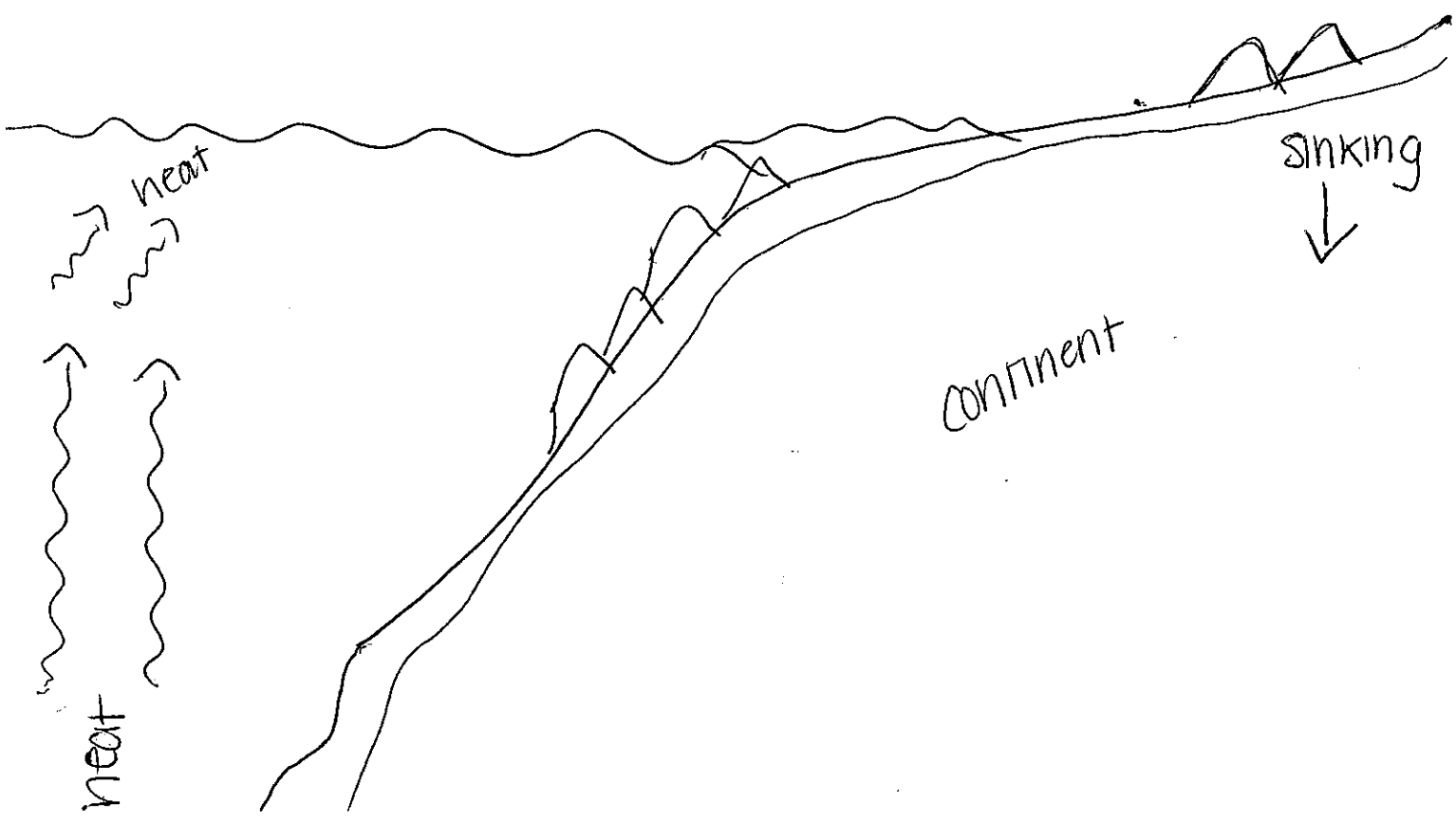
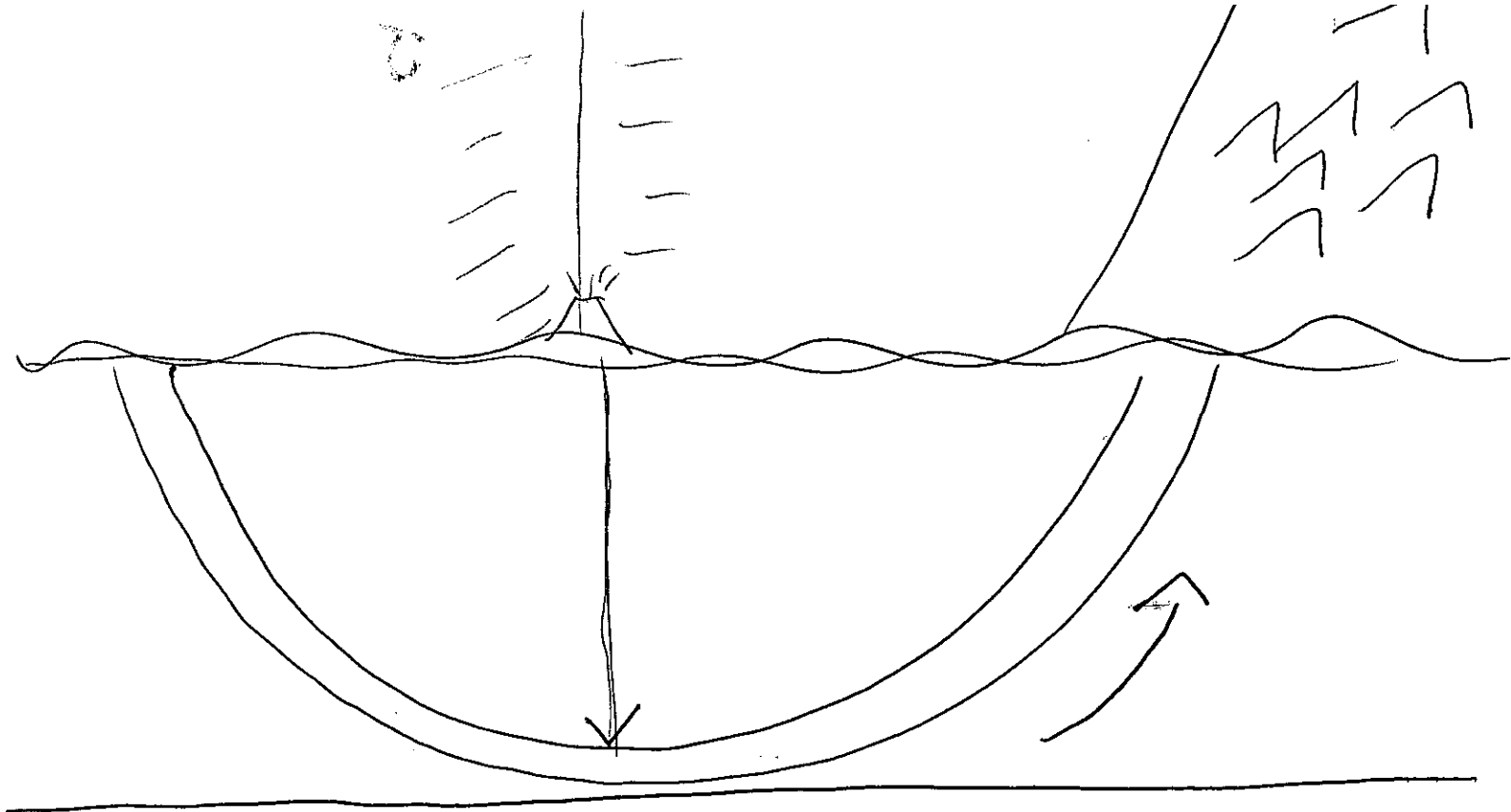
© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

1. Explain why density is such an important concept for asthenosphere convection.

density is important because if the oceanic crust isn't more dense than the continental, it won't sink and start the cycle of convection.

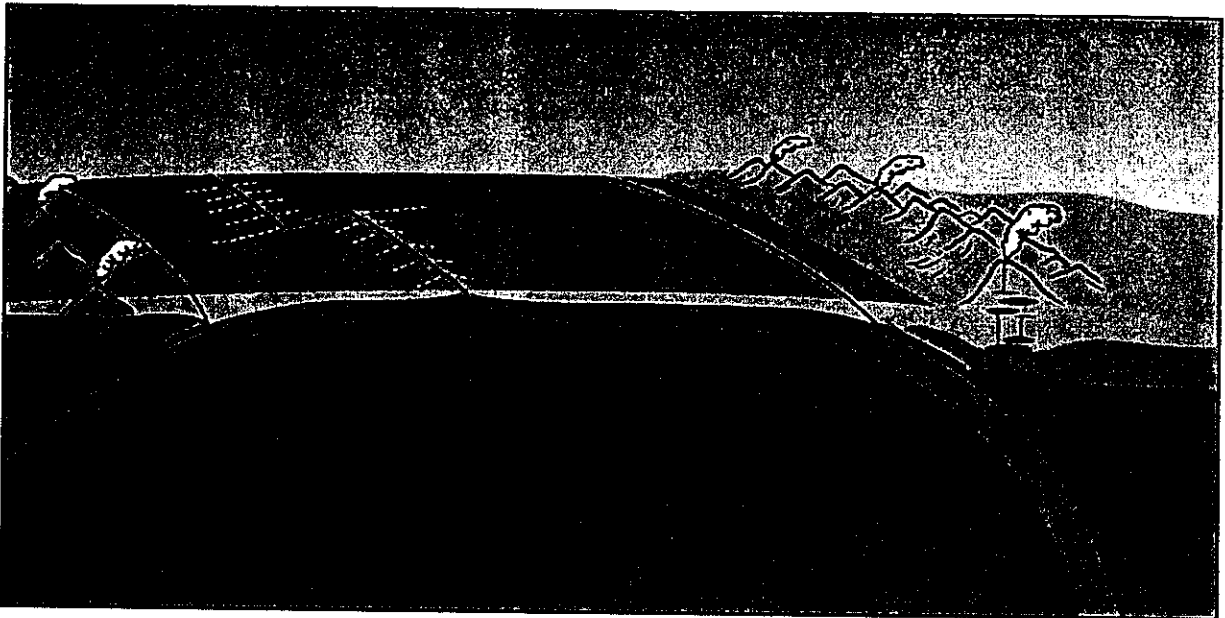
2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.
4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.

USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.



Part 2: Group Work

GROUP #: K
Student IDs of Members Present:
A43682453
A40461394.



© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

1. Explain why density is such an important concept for asthenosphere convection.

Density is such an important concept for asthenosphere convection because density is why things float or sink. The ocean is less dense than the continent so continents won't sink.

2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.

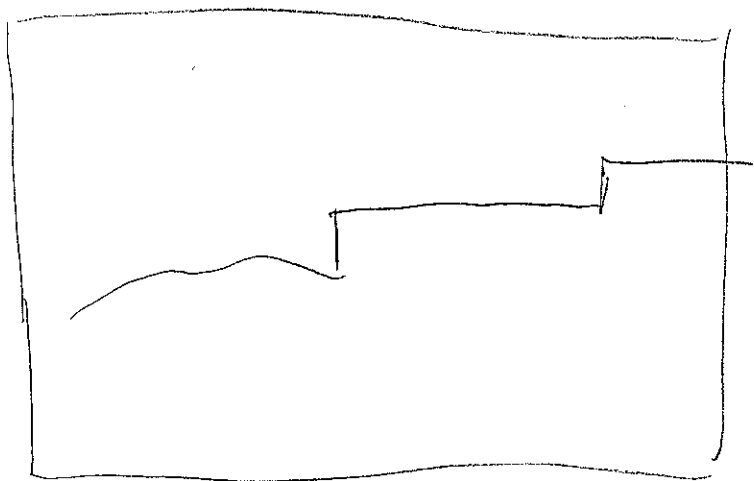
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world. The plates would no longer sink under each other, subduction, they would push each other up, create giant land masses → no more mt or volcanos.

4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.

The gravitational would no longer be coming from the core of the earth & earth's crust would sink so there wouldn't be land unless mountains or trench formed.

USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

3)



Part 2: Group Work

GROUP #: L
Student IDs of Members Present:
A41439593 A422045
A43440348 A42065731



© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

1. Explain why density is such an important concept for asthenosphere convection.

Density has an effect on convection because ^{more} dense, cooler earth sinks as less dense, warmer earth rises. This keeps the asthenosphere circulating.

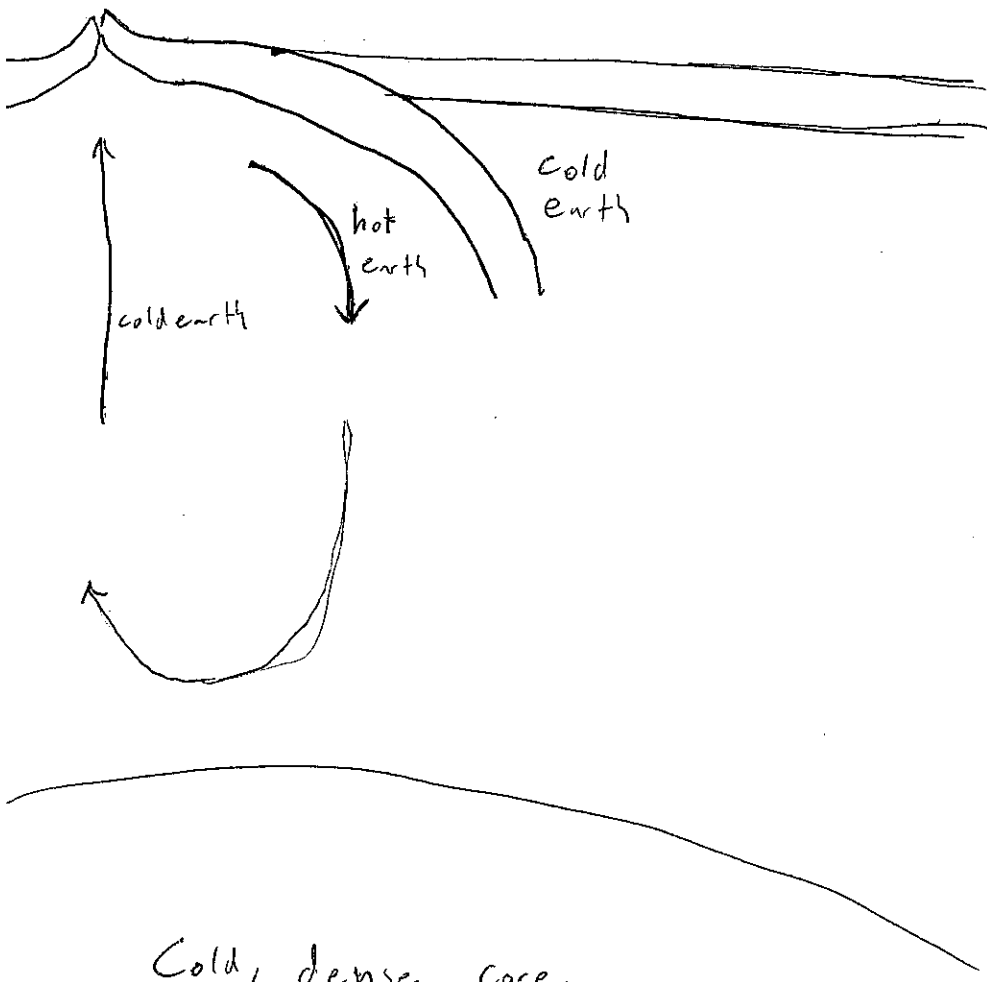
2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.

Cold, dense earth would rise and hot, less dense earth would sink. Convergence would occur in the opposite pattern.

4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.

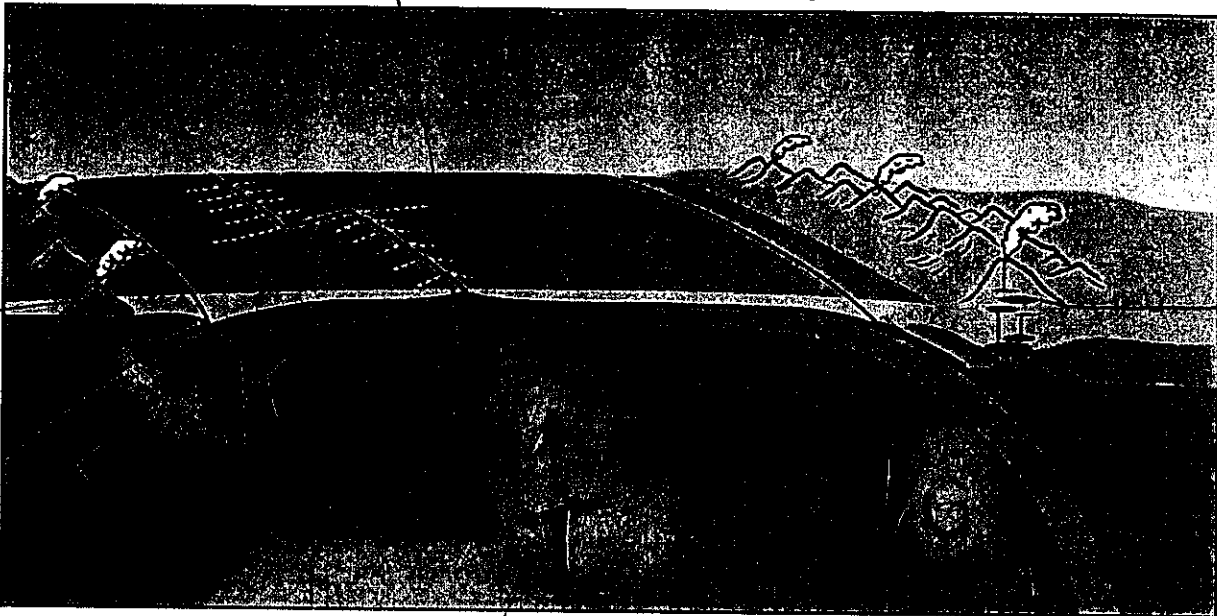
Colder, denser earth circulates upward and warmer, less dense earth circulates downward.

USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.



Part 2: Group Work

GROUP #: M
Student IDs of Members Present:
A34305310
A42383915
A43915317



© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

1. Explain why density is such an important concept for asthenosphere convection.

As new plate material is formed, it is equally destroyed as 2 plates converge. One plate becomes cooler and thus more dense and sinks below the less dense plate where it is destroyed. Without density each plate would be of equal "level" and plate material wouldn't be destroyed. With this, new plate would be created but not destroyed.

2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.

3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.

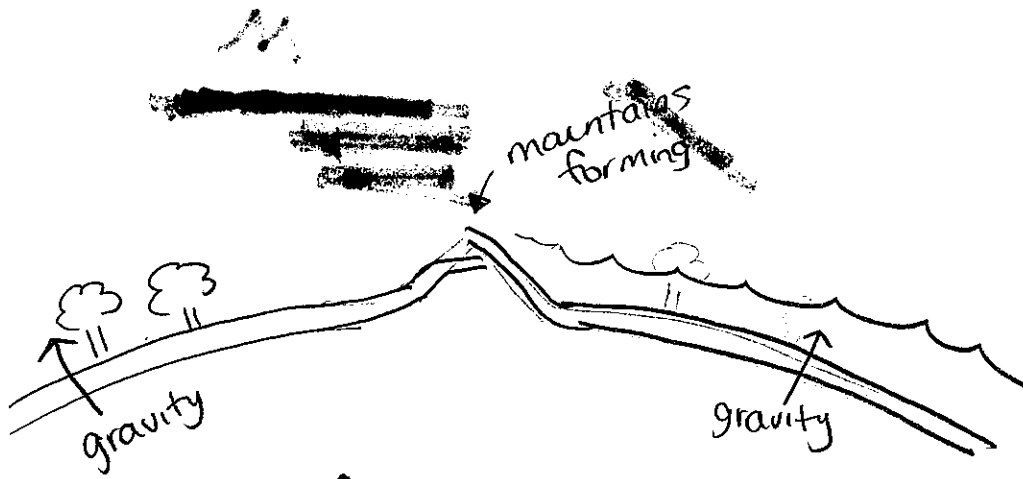
Gravity will pull the less dense material "up" (surface) rather than "down" (toward core). This would cause converging plates to converge, essentially upward. From this more mountains would form as the more dense material is pulled upward above the less dense due to gravity.

4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.

Heat would still come from within the earth up to the surface. However, as new plate material is formed, because it is now more dense, it will sink quicker. From this, the new plate material will either recycle faster or not be able to form at all.

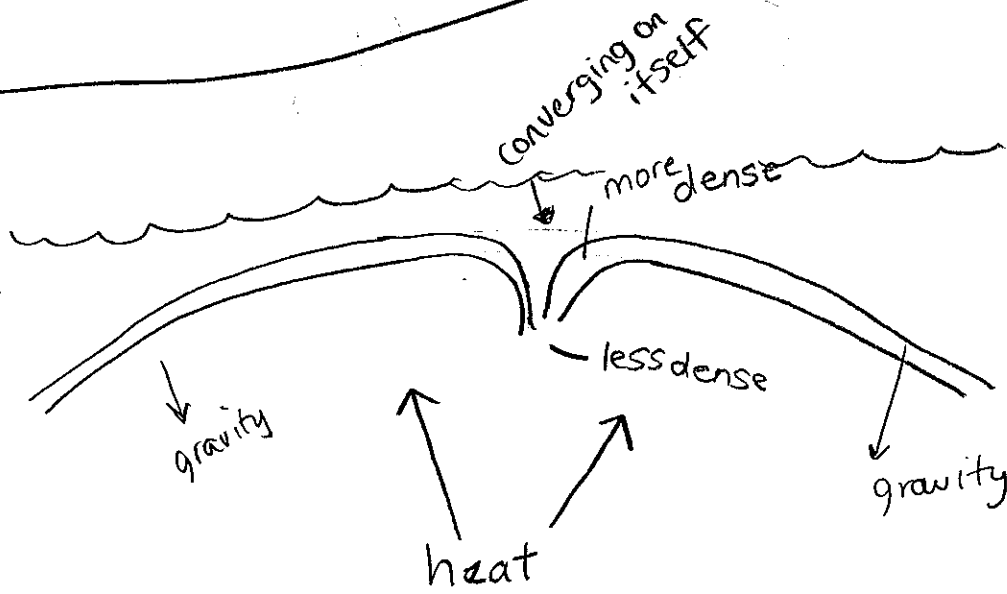
USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

3.



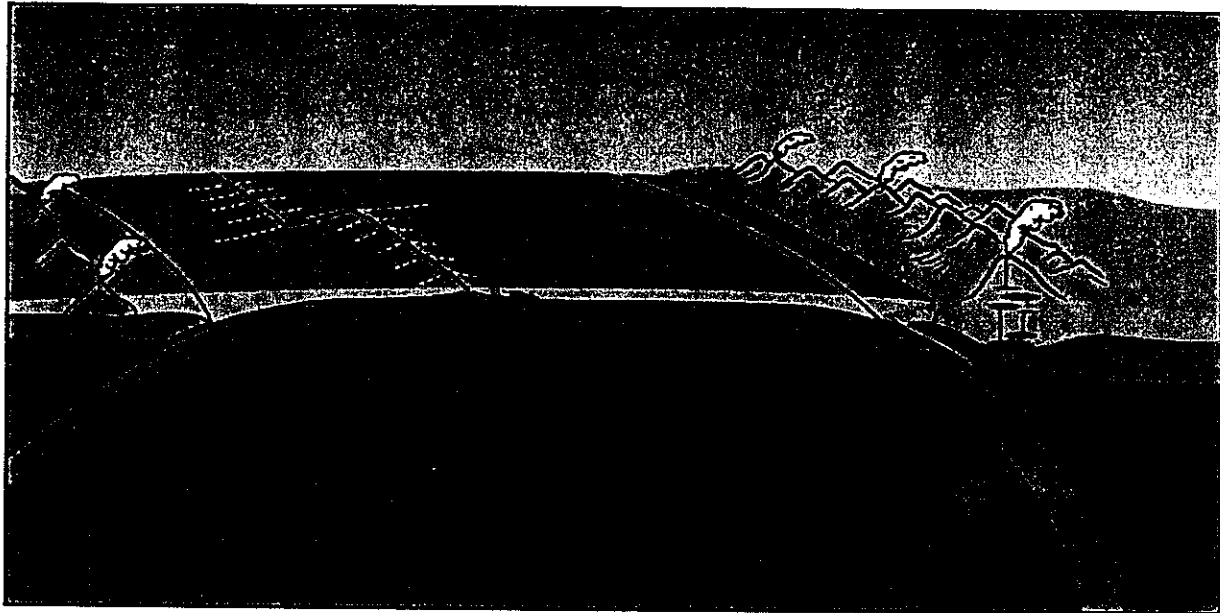
heat

4.



Part 2: Group Work

GROUP #: N
Student IDs of Members Present:
A42669593 A4107889
A43637189 A42833012



© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

1. Explain why density is such an important concept for asthenosphere convection.
Density is an important concept because the materials either sink or rise. It's important for the materials to sink because that is what pulls the plate toward the subduction zone.

2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.

3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.

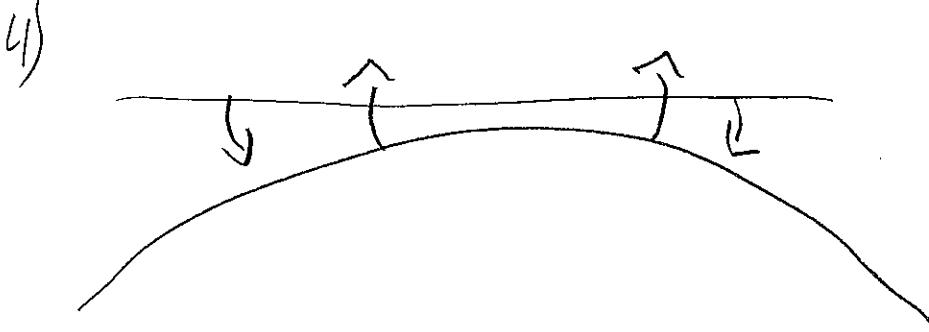
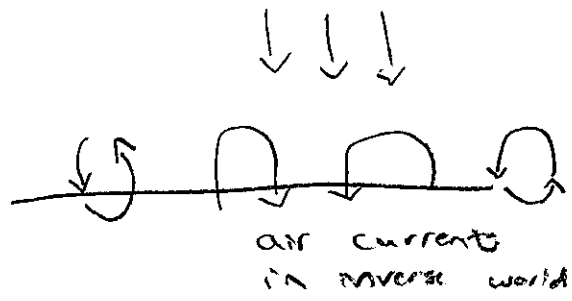
The continental crust would not be pushed up, creating mountains. Subduction would be opposite & the oceanic crust would be thicker.

4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.

It would be the opposite. Subduction would not occur in the same way. So mountains would not be created. The crust would be thicker.

USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

3.



Part 2: Group Work

GROUP #: 0

Student IDs of Members Present:

A43643320

A41096642

A34590917

A41262816



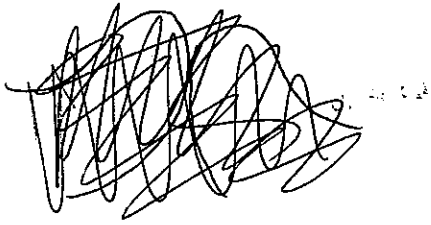
1. Explain why density is such an important concept for asthenosphere convection.

Density is what allows the asthenosphere convection to continuing cycling, as the lithosphere sinks the convection currents cycle & create a new lithosphere

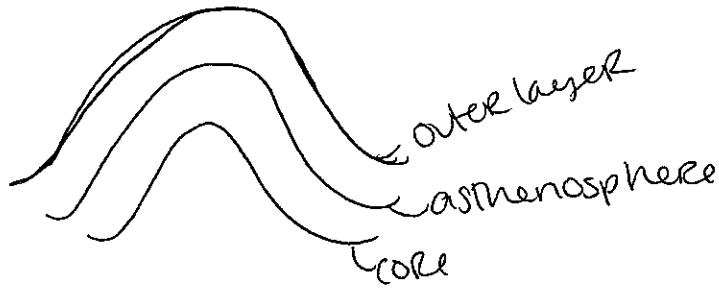
2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.
4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.

USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

Continents never sink, only ocean floor. Continents are light material, oceans are heavier

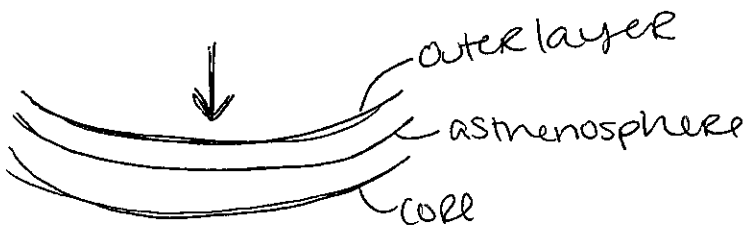


3)



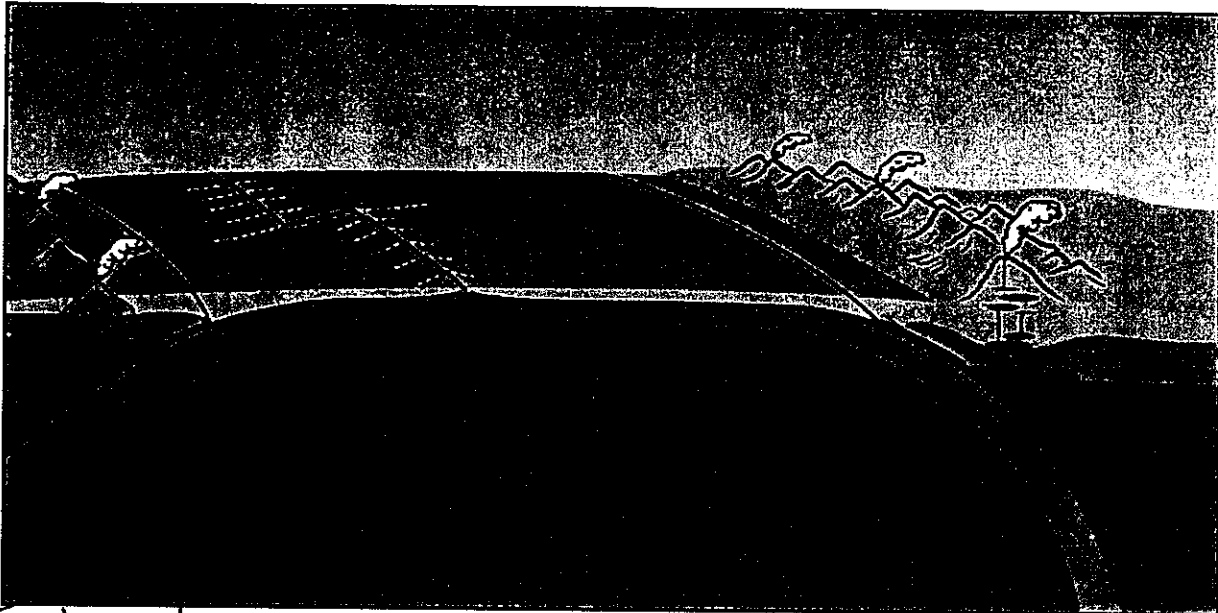
everything
would be
pulled up
towards the
surface

4



everything would sink
down towards the core

Part 2: Group Work

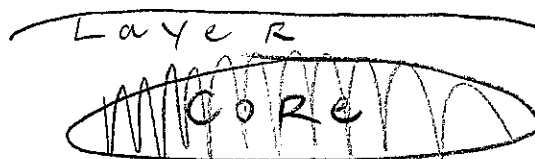


© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

1. Explain why density is such an important concept for asthenosphere convection.

Chemical
Density is such an important concept for asthenosphere convection because the materials depending on density will rise or sink.

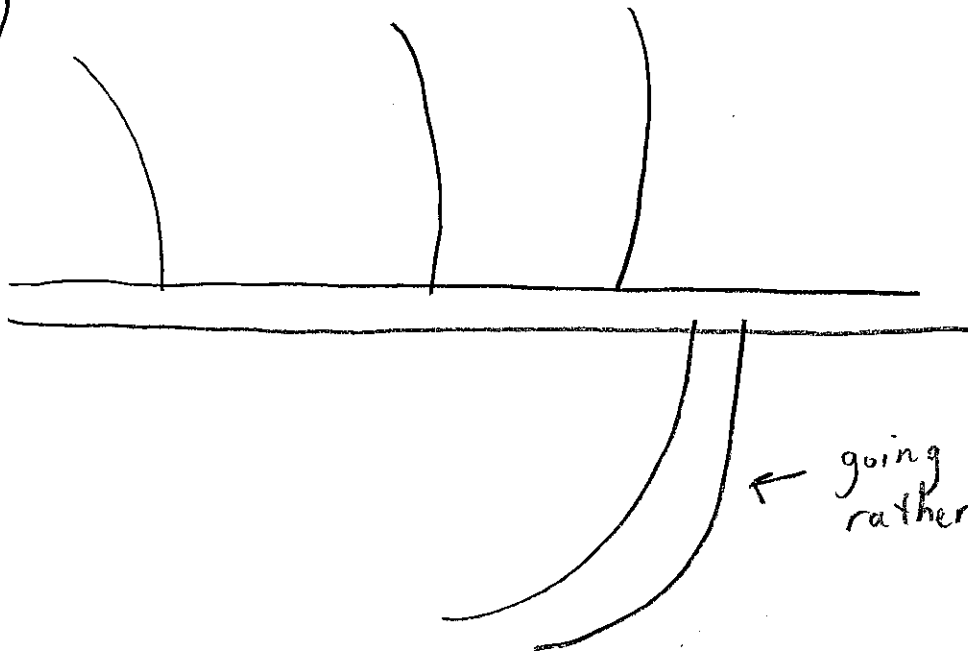
2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.
If convection were reversed, a change in density and material would occur. See back for diagram.
4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.



Even if the density is affected, the crust won't rise due to gravity. It sinks at a slower route.

USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

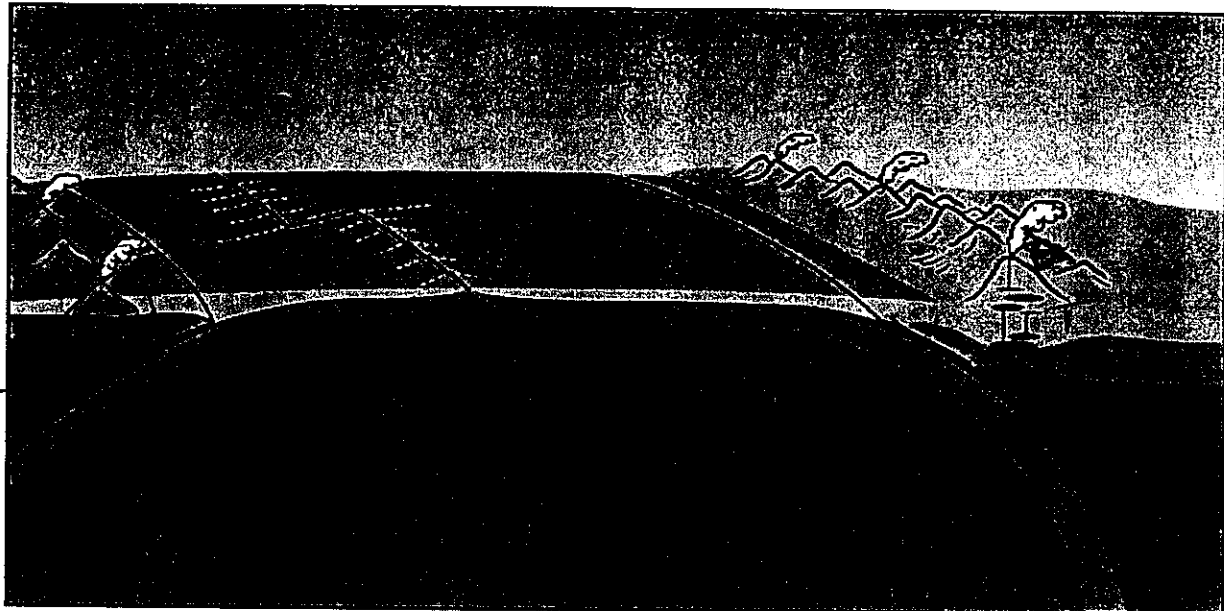
3)



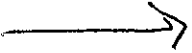
← going up
rather than Down

Part 2: Group Work

GROUP #: 6
Student IDs of Members Present:
A43143418 A43301981
A43414990 A43028397

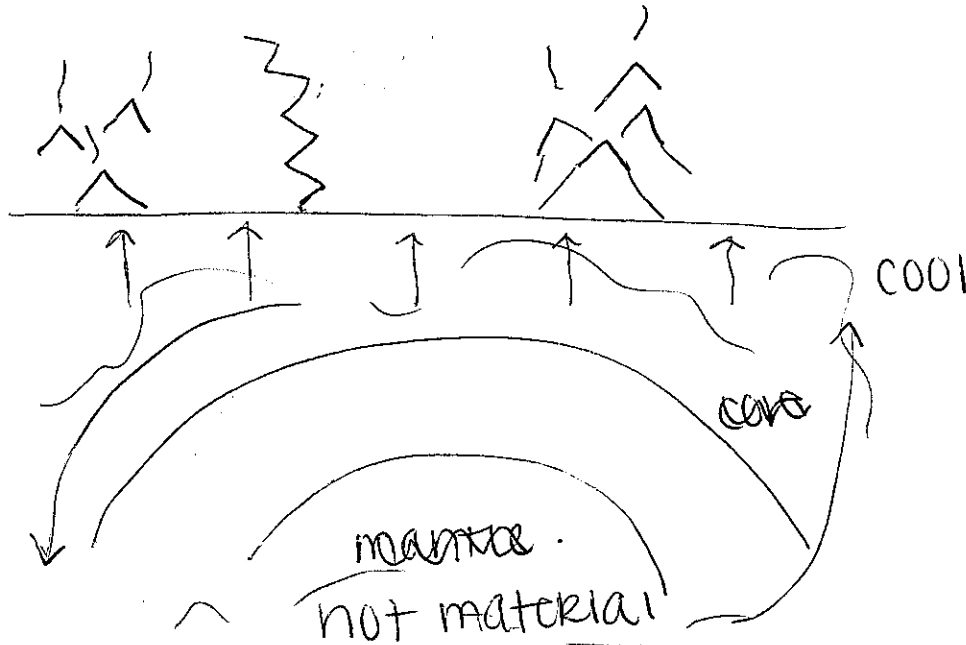


© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

1. Explain why density is such an important concept for asthenosphere convection.
The only reason why convection occurs is because objects that are more dense sink. And as those dense objects/liquids are heated up they travel back to the surface to start the cycle again.
2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.

4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.

USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

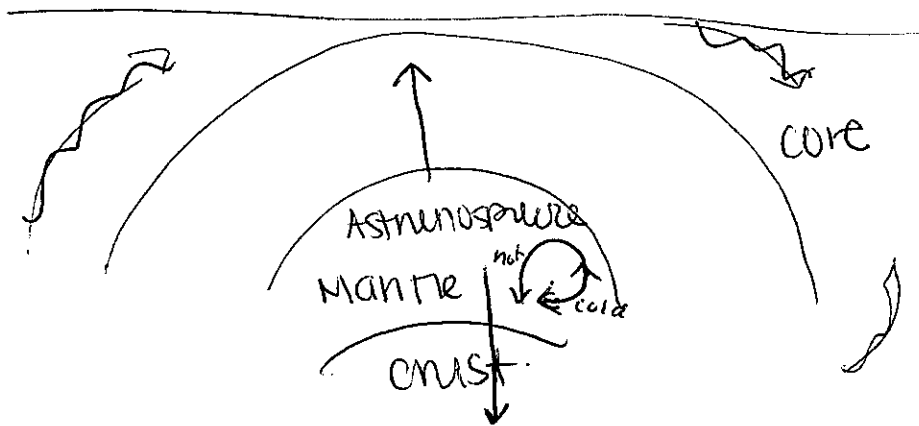
3.



- hot material would sink
- cool material would rise

caused by gravity
which would actually be pulling
material upward instead
of down.

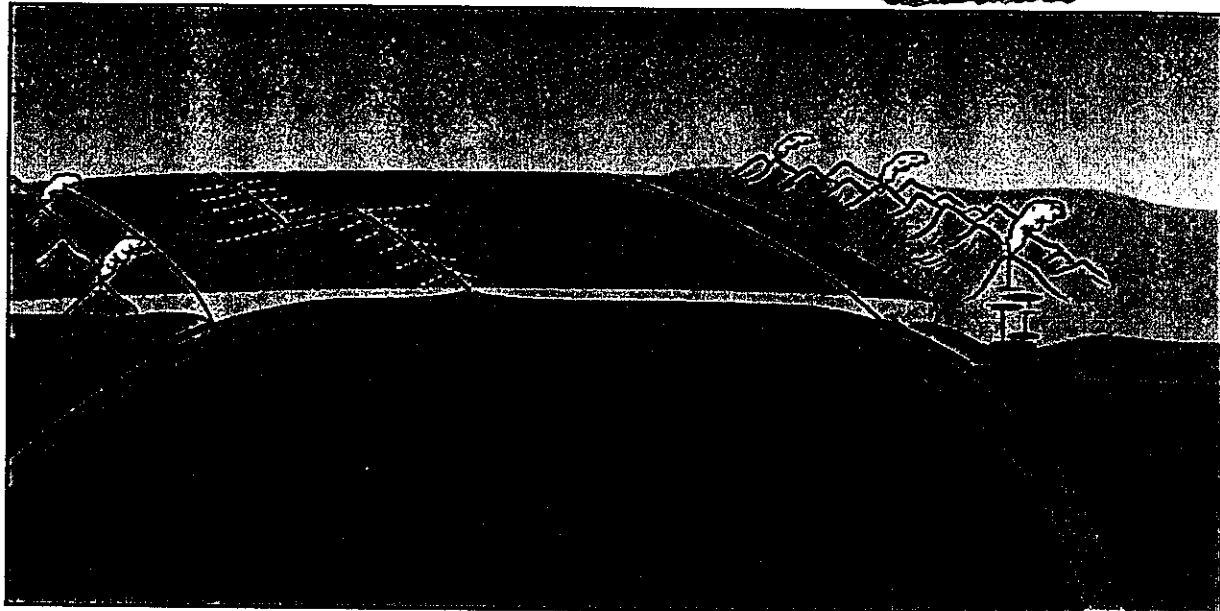
4. the core would be the outer layer and the asthenosphere
would be the inner layer



- cold things rise
- hot things sink

Part 2: Group Work

GROUP #: R
Student IDs of Members Present:
A39979826, A40711436,
A40683630, A40994271,

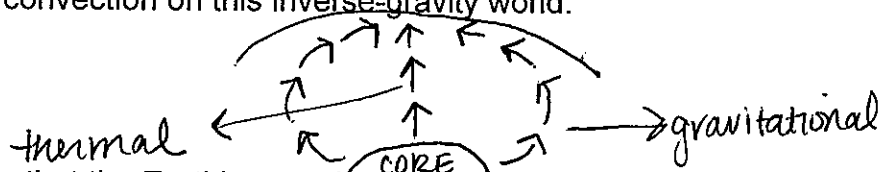


© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)
Thermal / Chemical Gravitational

1. Explain why density is such an important concept for asthenosphere convection.

Density is such an important concept for asthenosphere convection because convection is driven by temperature & density changes the temperature & makes it cooler so ~~hot air~~ ^{hot air} rises letting convection cycle happen.

2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.



4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.



USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

Part 2: Group Work



© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

1. Explain why density is such an important concept for asthenosphere convection.

Density causes movement in this cycle. Cooler, more dense lithospheric material sinks, while the warmer, less dense material rises.

2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.

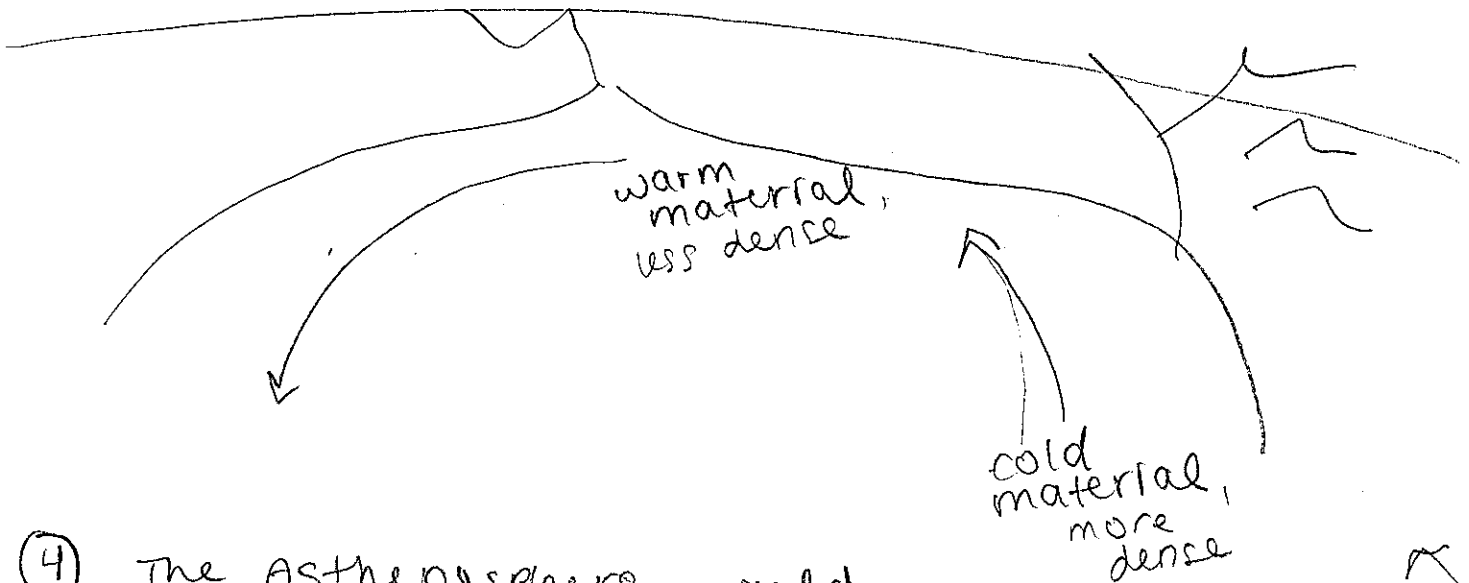
Back →

4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.

USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

③

This reverses the direction of convection.



④ The Asthenosphere would be more dense and so the gravitational force would be pulled toward the Earth's surface/crust. It would have the same affect as number 3. see diagram

Part 2: Group Work

GROUP #: T

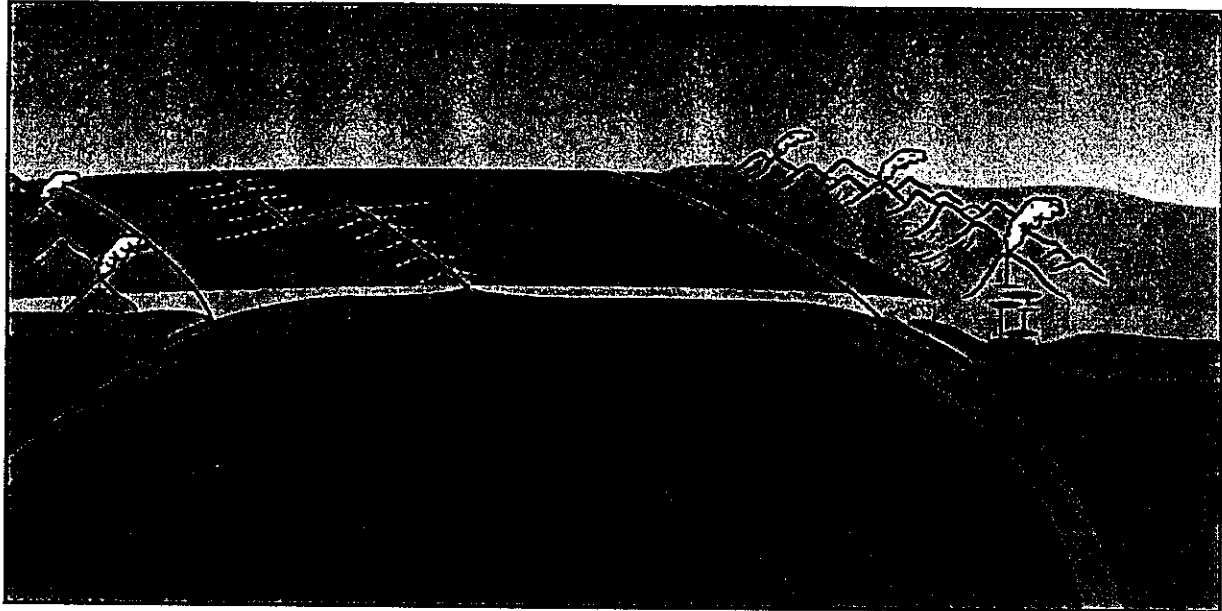
Student IDs of Members Present:

A39743811

A44013916

A39737915

A42185423



© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

1. Explain why density is such an important concept for asthenosphere convection.

Density drives convection in the mantle and causes the movement of the physical material, which in turn causes the heat transfer in the crust.

2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.

More dense material would move to the surface.

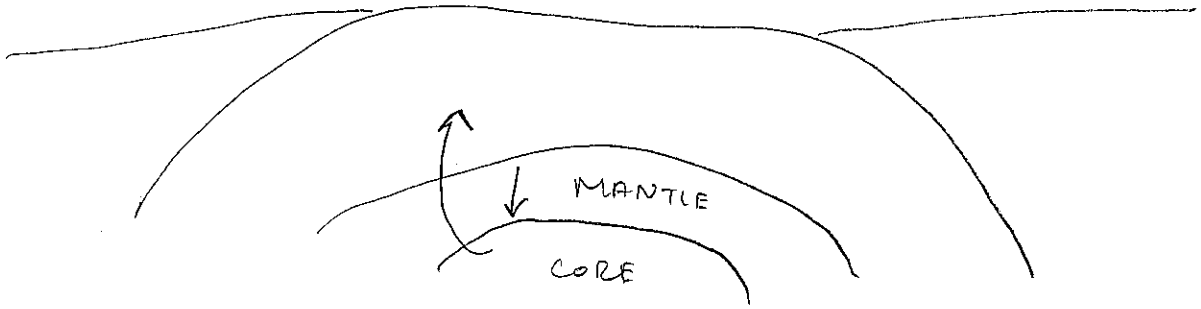
The dense core material is moving towards the Earth's surface, pushing the less dense mantle down.

4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.

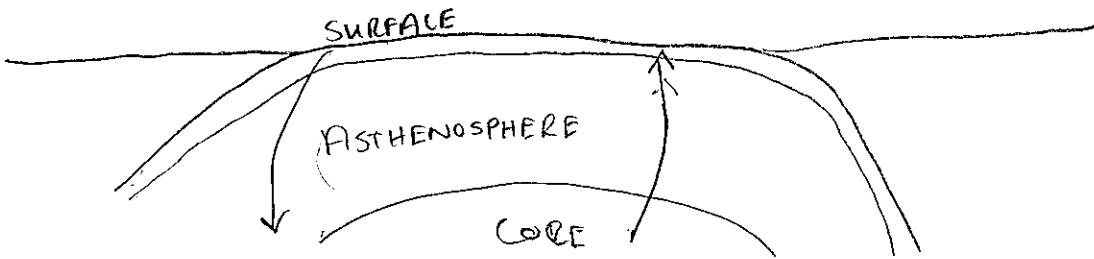
The core is being pushed up by the surface which is the most dense & is going down.

USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

3.)



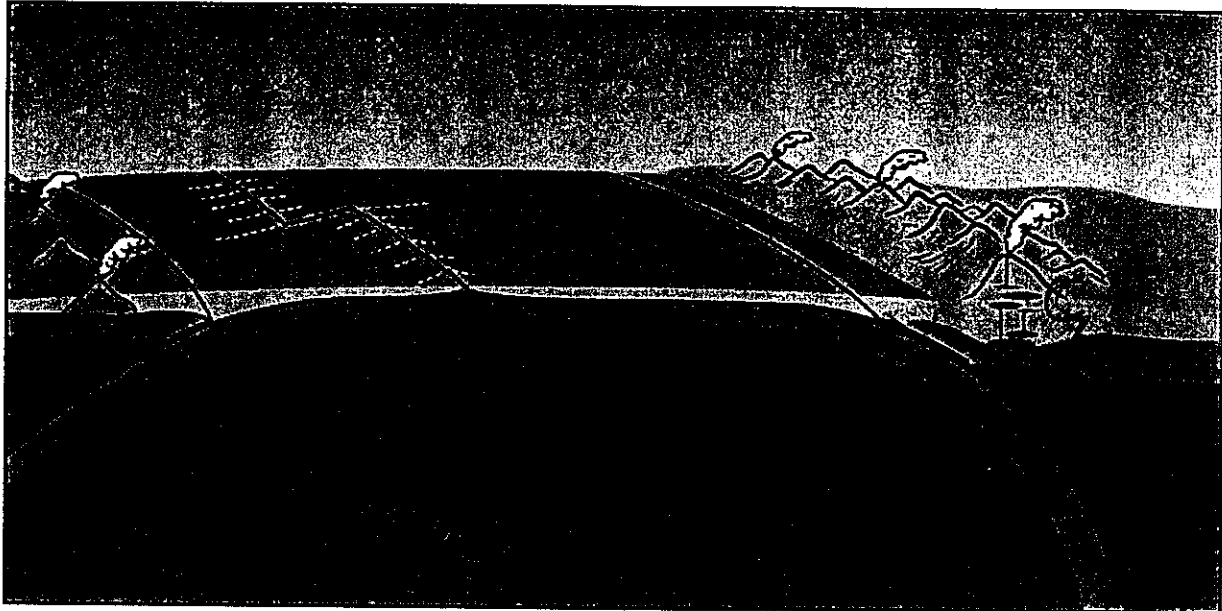
4.)



Part 2: Group Work

GROUP #: ~~X~~
Student IDs of Members Present:

~~A43012134~~
~~A4039854~~
~~A31630993~~



© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

1. Explain why density is such an important concept for asthenosphere convection.
Colder denser material sinks and ^{warm} less dense material rises.
2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.

on back

4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.

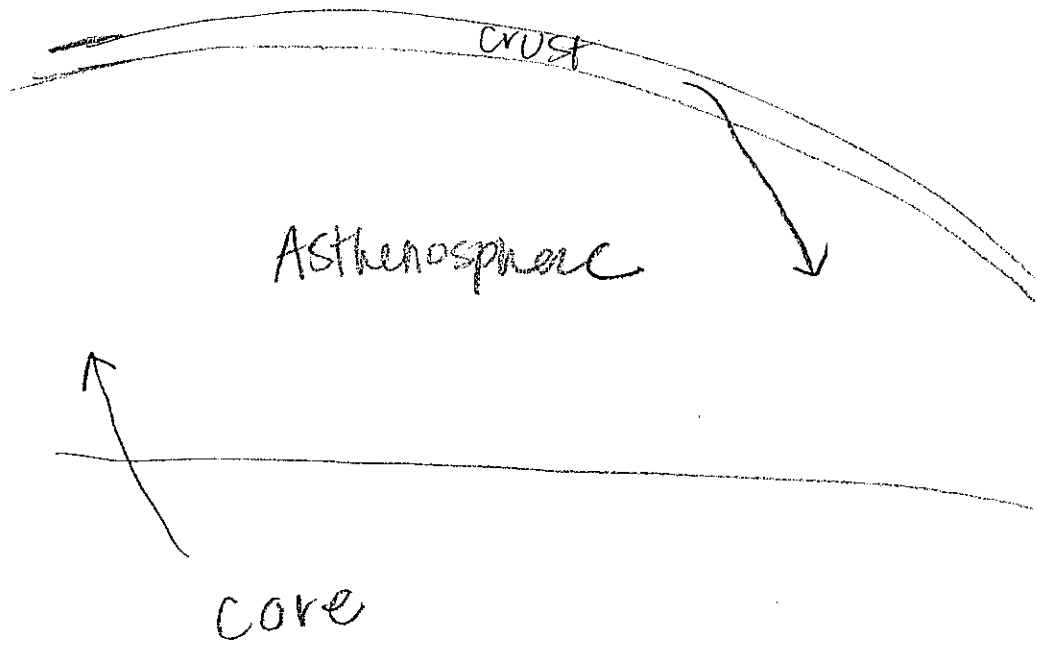
on back

USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

3



4



Part 2: Group Work

GROUP #: 7

Student IDs of Members Present:

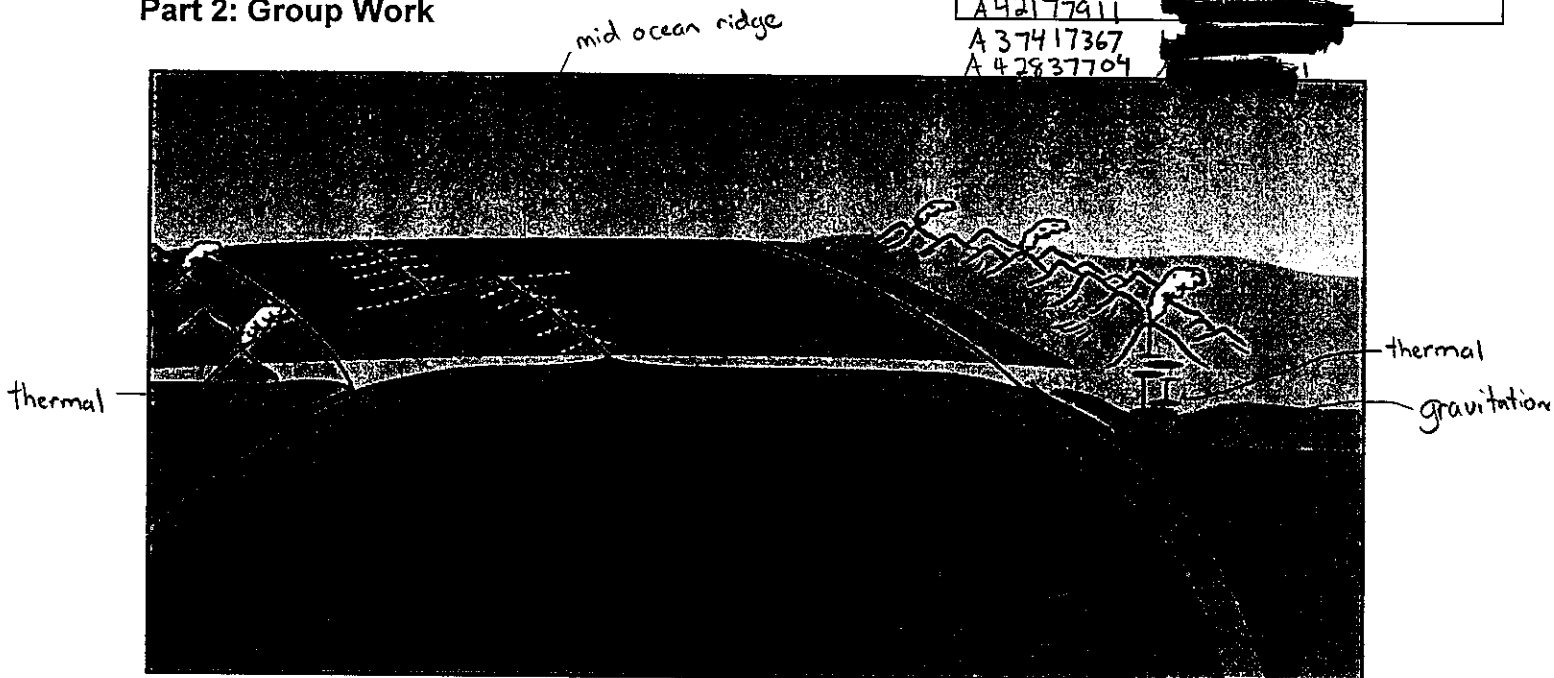
A35919773

A40491423

A42177911

A37417367

A42837704

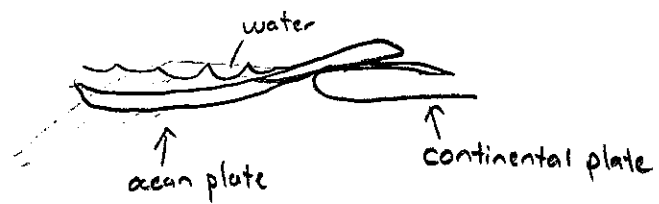


© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

1. Explain why density is such an important concept for asthenosphere convection. ^{Chemical} ^{-mvt of thermal energy}
Density determines how the plates move. Denser plates sink under the less dense plates, and when the asthenosphere heats up, it rises to the top of the asthenosphere.
2. Label the diagram above to indicate where gravitational (G), chemical (C) and thermal (T) energy are driving asthenosphere circulation.
3. What would happen to convection in the asthenosphere if gravity pulled material towards Earth's surface, rather than towards Earth's center? Draw a diagram that shows convection on this inverse-gravity world.
The plates (ocean-continent) would switch roles, having the plate under the ocean push the continent down, or the plate would push itself on top of the continental plate.
4. Imagine that the Earth's outer layer is made up of material that is denser than the Earth's asthenosphere, and that the Earth's core is made up of material that is less dense than Earth's asthenosphere. What would convection look like on this Earth? Draw a diagram that shows convection under these conditions.
The asthenosphere would replace the Earth's core in the middle of the Earth, and the core would be around the asthenosphere.

USE THE BACK OF THIS PAGE FOR DRAWINGS IN QUESTIONS 3 AND 4 AS NEEDED.

3.



4.

